ESTIMATED SEDIMENT DEPOSITION IN LAKE CORPUS CHRISTI, TEXAS, 1972-85

By Norman F. Leibbrand

U.S. GEOLOGICAL SURVEY

Open-File Report 87-239

Austin, Texas

1987

DEPARTMENT OF THE INTERIOR

DONALD PAUL HODEL, Secretary

U.S. GEOLOGICAL SURVEY

Dallas L. Peck, Director

For additional information write to:

District Chief
U.S. Geological Survey
649 Federal Bldg.
300 E. Eighth St.
Austin, TX 78701

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CONVERSION FACTORS

Factors for converting inch-pound units to metric (International System) units are given in the following table:

Multiply inch-pound unit	By	To obtain metric unit
acre-foot (acre-ft)	1,233	cubic meter
mile	1.609	kilometer
pound per cubic foot (lb/ft^3)	16.02	kilogram per cubic meter
square mile	2.590	square kilometer
ton	0.9072	megagram

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ABSTRACT

The investigation of sediment deposition in Lake Corpus Christi was initiated by researching the published and unpublished sediment data for the 1972-85 water years for stations located upstream and downstream of the lake. Regression analysis was used to fill in the missing data. Data were tabulated for monthly discharge (acre-feet) and sediment load (tons, acre-feet, and percent by weight). Yearly totals and cumulative averages were computed and included in the tables.

An estimated 10,300 acre-feet (wet volume) of sediment has been deposited in Lake Corpus Christi during the 14-year period of record (1972-85), an average of 736 acre-feet per year (wet volume). An earlier study by the U.S. Soil Conservation Service, based on 1942-48 changes of lake bottom contours, estimated that 736 acre-feet per year of suspended sediment had entered Lake Corpus Christi during that 6-year period.

Some difference was found in comparison of the results of the U.S. Geological Survey (Water Resources Division) study and the McCaughan and Etheridge Consulting Engineers study. Total sediment outflow from Lake Corpus Christi was estimated at 177 acre-feet (dry) by the Geological Survey and 1,070 acre-feet (dry) by McCaughan and Etheridge Consulting Engineers. This difference may be due to construction of a new dam, completed in 1958, that is higher and inundated the old dam.

INTRODUCTION

The water-storage capacity of Lake Corpus Christi is being reduced by sediment deposition. The amount of sediment deposition in the lake has been documented through 1972 by Brown and others (1948) and McCaughan and Etheridge Consulting Engineers (1973), but no documentation or surveys have been made since then. Similar information was needed for 1972-85; thus, the city of Corpus Christi requested the Geologic Division to obtain this information.

In the spring of 1986, the Geologic Division of the U.S. Geological Survey (USGS) made a request that the Water Resources Division (WRD) cooperate with them in an investigation of the extent of sediment deposition in Lake Corpus Christi during the 1972-85 water years. WRD was requested to compile and update all the sediment records, both published and unpublished, for active and discontinued sediment stations upstream and downstream of Lake Corpus Christi and use those records to make estimates of sediment deposition in the lake during this period of record.

The purpose of this report is to present the results of WRD's investigation to the Geological Division so that they can correlate the results of their field surveys with WRD's results. Other reports of sediment surveys and published data that were used in preparing this report are cited in "Selected references."

Lake Corpus Christi, located on the Nueces River, is impounded by Wesley E. Seale Dam. The dam is located in San Patricio and Jim Wells Counties, about 4.5 mi southwest of Mathis. The lake borders these two counties and extends into Live Oak County (fig. 1). Water is released downstream for domestic, municipal, irrigation, mining, and industrial uses in the Corpus Christi area. The water demands placed on Lake Corpus Christi are rapidly approaching its

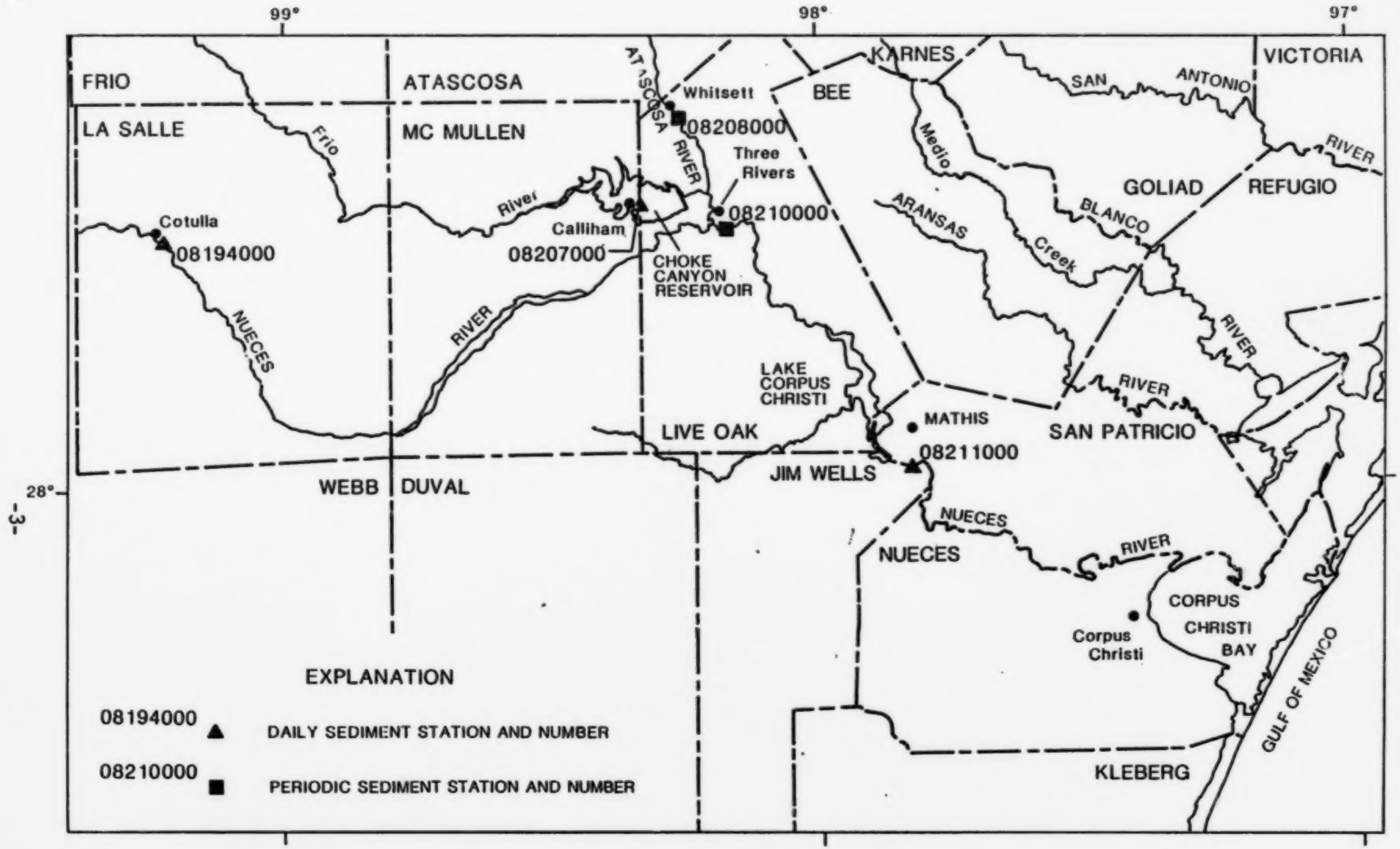

Figure 1.--Location of study area.

annual dependable water yield. To supplement water yield from the basin, Choke Canyon Reservoir has been constructed on the Frio River, the principal tributary to the Nueces River upstream from Lake Corpus Christi. Choke Canyon Reservoir, when filled and fully operational, will be operated to optimize the annual flow into Lake Corpus Christi.

SEDIMENT STATIONS AND RECORDS

Sediment stations, both active and discontinued, are listed below with the agency that operated them, drainage area, type of record, and period of record:

Station		Agency 1/	Drainage area (mi^2)	Type or record	Period of record
08194000	Nueces River near Cotulla	TWDB	5,260	Daily	1941-79
08207000	Frio River at Calliham	TWDB	5,491	Daily	1941-79
		USGS	5,491	Periodic (6-9/year)	1977-81
08208000	Atascosa River at Whitsett	USGS	1,171	Periodic (6-9/year)	1977-81
08210000	Nueces River at Three Rivers	USGS	15,600	Periodic (6-12/year)	1975-85
08211000	Nueces River near Mathis (below Lake Corpus Christi)	TWDB	16,660	Daily	1941-58, 1961-85

1/ TWDB, Texas Water Development Board; USGS, U.S. Geological Survey.

The location of these stations is shown in figure 1.

The sediment records generated by the Texas Water Development Board (TWDB) were updated by tabulating existing monthly sediment data from TWDB publications and, as yet, unpublished data. These data were keyed into computer files, one file for each of the three TWDB stations during 1972-79 (to 1984 for the Mathis

station). Then regression analysis was used to complete these sediment records up to 1985.

Prior to regression analysis, the data were transformed to logarithms base 10 to provide for a normal distribution of the data. A log quadratic regression proved to provide the best fit regression. For the daily sediment stations operated by the TWDB (Cotulla, Calliham, and Mathis), regression analyses were done using monthly discharge and monthly sediment load. For those periodic sediment stations operated by the Geological Survey (Whitsett and Three Rivers), the regression analyses were made using instantaneous discharge and sediment loads. Monthly discharges and monthly sediment loads were then computed from continuous records of mean daily discharge. The regression coefficients and R-square value for each station are presented in the following table.

Station	Log^{10} discharge coefficient	Log^{10} discharge squared coefficient	R-square value
08194000	0.1260	0.1486	0.980
08207000	.5252	.1779	.990
08208000	.4789	.1376	.978
08210000	.4352	.1649	.950
08211000	.2850	.0809	.996

Using the log-quadratic equation and the regression coefficients for station 08211000, and assuming a total monthly discharge of 1,000 acre-ft, the monthly sediment load for the Mathis station can be computed from the following:

$$\log^{10}(\text{monthly sediment load}) = 0.2850 \times \log^{10}(\text{discharge}) + 0.0809 \times (\log^{10}(\text{discharge}))^2$$

$$= 0.2850 \times 3 + 0.0809 \times (3)^2$$

$$= 0.855 + 0.7821$$

$$= 1.583$$

$$\text{monthly sediment load} = 10^{1.583}$$

$$= 38.3 \text{ tons}$$

Computation of monthly sediment load using the above equation can also be applied for the Cotulla and Calliham stations. Daily sediment loads can be computed for the Whitsett and Three Rivers stations using values of mean daily discharge. Monthly discharge and suspended sediment loads were computed from 1972 to 1985. However, only the TWDB data for the Cotulla and Calliham stations that had been published (1972-76) and unpublished data (1977-79) were used to update tables 1 and 2 from 1972 to 1979. Data generated by regression analysis were used to update tables 1 and 2 from 1980 to 1985. The stream gage on the Frio River at Calliham was discontinued in February 1981, so the period of record for that station ends at that time. All of the data for the Mathis station generated by TWDB during 1972-84 was tabulated to update table 3. Only the 1985 water year was simulated (regression). In addition, total discharge, total suspended sediment load, and cumulative average were computed and tabulated in the tables by water year.

The two stations operated by the USGS (Whitsett and Three Rivers) were statistically analyzed in the same manner as the three stations operated by the TWDB, but the analyses were based on only a few periodic samples, and therefore, the regression analyses probably are not as accurate. Thus, the data for these two stations consist of data generated wholly by regression analysis for 1972 to 1985 (tables 4 and 5).

TABLE 1.--Monthly, yearly, and cumulative average discharge and sediment loads for station 08194000 Nueces River at Cotulla, Texas, 1972-85

(ac-ft, acre-feet; % wt, percent weight; cum. avg., cumulative average)

WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT	WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT
1972	OCT.	190,700	21,740	14	.008	1973	OCT.	1,760	50	0	.002
	NOV.	24,680	2,700	2	.008		NOV.	12	0	0	.000
	DEC.	12,780	1,190	1	.007		DEC.	19	0	0	.000
	JAN.	8,370	719	0	.006		JAN.	514	22	0	.003
	FEB.	5,600	497	0	.007		FEB.	1,360	47	0	.003
	MAR.	2,570	216	0	.006		MAR.	1,170	39	0	.002
	APR.	179	8	0	.003		APR.	181	5	0	.002
	MAY	6,120	547	0	.007		MAY	18	0	0	.000
	JUNE	1,370	57	0	.003		JUNE	0	0	0	.000
	JULY	15	0	0	.000		JULY	11,530	1,470	1	.009
	AUG.	33,270	3,350	2	.007		AUG.	3,140	174	0	.004
	SEPT.	6,300	447	0	.005		SEPT.	29,710	11,340	7	.028
	YEAR	292,000	31,470	21	.008		YEAR	49,410	13,150	9	.020
1972	CUM.AVG.	292,000	31,470	21	.008	1973	CUM.AVG.	170,700	22,310	15	.010

WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT	WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT
1974	OCT.	156,200	71,560	47	.034	1975	OCT.	2,710	89	0	.002
	NOV.	29,000	3,470	2	.009		NOV.	15,600	1,220	1	.006
	DEC.	14,340	563	0	.003		DEC.	5,240	97	0	.001
	JAN.	7,030	147	0	.002		JAN.	4,390	107	0	.002
	FEB.	3,900	120	0	.002		FEB.	4,660	185	0	.003
	MAR.	9,030	2,630	2	.021		MAR.	2,040	72	0	.003
	APR.	1,400	63	0	.003		APR.	4,160	337	0	.006
	MAY	12,240	1,330	1	.008		MAY	7,200	1,100	1	.011
	JUNE	205	3	0	.001		JUNE	119,700	8,320	5	.005
	JULY	0	0	0	.000		JULY	49,630	3,370	2	.005
	AUG.	20,990	4,850	3	.017		AUG.	7,980	363	0	.002
	SEPT.	26,150	4,700	3	.013		SEPT.	3,800	174	0	.003
	YEAR	280,500	89,440	59	.023		YEAR	227,100	15,430	10	.005
1974	CUM.AVG.	207,300	44,690	30	.016	1975	CUM.AVG.	212,300	37,370	25	.013

WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT	WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT
1976	OCT.	2,070	52	0	.002	1977	OCT.	26,530	1,610	1	.004
	NOV.	1,930	52	0	.002		NOV.	65,340	3,780	2	.004
	DEC.	142	0	0	.000		DEC.	24,760	1,030	1	.003
	JAN.	7	0	0	.000		JAN.	16,990	356	0	.002
	FEB.	3	0	0	.000		FEB.	14,290	308	0	.002
	MAR.	0	0	0	.000		MAR.	11,110	398	0	.003
	APR.	0	0	0	.000		APR.	39,140	4,480	3	.008
	MAY	2,780	261	0	.007		MAY	41,190	3,660	2	.007
	JUNE	1,170	50	0	.003		JUNE	11,560	623	0	.004
	JULY	79,990	10,290	7	.010		JULY	3,820	221	0	.004
	AUG.	34,510	2,960	2	.006		AUG.	696	25	0	.003
	SEPT.	24,940	1,720	1	.005		SEPT.	0	0	0	.000
	YEAR	147,500	15,390	10	.008		YEAR	255,400	16,490	11	.005
1976	CUM.AVG.	199,300	32,980	22	.012	1977	CUM.AVG.	208,700	30,230	20	.011

TABLE 1.--Monthly, yearly, and cumulative average discharge and sediment loads for station 08194000 Nueces River at Cotulla, Texas, 1972-85--Continued

(ac-ft, acre-feet; % wt, percent weight, cum. avg., cumulative average)

WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT	WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT
1978	OCT.	0	0	0	.000	1979	OCT.	279	1	0	.000
	NOV.	384	11	0	.002		NOV.	17	0	0	.000
	DEC.	2,025	66	0	.002		DEC.	130	0	0	.000
	JAN.	287	4	0	.001		JAN.	39	0	0	.000
	FEB.	0	0	0	.000		FEB.	3	0	0	.000
	MAR.	0	0	0	.000		MAR.	0	0	0	.000
	APR.	0	0	0	.000		APR.	11,278	1,530	1	.010
	MAY	8,737	2,940	2	.025		MAY	6,533	518	0	.006
	JUNE	17,083	4,190	3	.018		JUNE	152,495	18,560	12	.009
	JULY	11	0	0	.000		JULY	882	24	0	.002
	AUG.	700	123	0	.013		AUG.	0	0	0	.000
	SEPT.	5,980	961	1	.012		SEPT.	0	0	0	.000
	YEAR	35,207	8,300	5	.017		YEAR	171,656	20,630	14	.009
1978	CUM.AVG.	183,900	27,100	18	.011	1979	CUM.AVG.	182,300	26,290	17	.011

WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT	WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT
1980	OCT.	0	0	0	.000	1980	OCT.	0	0	0	.000
	NOV.	0	0	0	.000		NOV.	0	0	0	.000
	DEC.	0	0	0	.000		DEC.	0	0	0	.000
	JAN.	0	0	0	.000		JAN.	0	0	0	.000
	FEB.	0	0	0	.000		FEB.	0	0	0	.000
	MAR.	0	0	0	.000		MAR.	0	0	0	.000
	APR.	0	0	0	.000		APR.	24,004	2,534	2	.008
	MAY	47,535	6,929	5	.011		MAY	63,147	10,714	7	.029
	JUNE	24,339	2,585	2	.008		JUNE	237,078	93,593	61	.029
	JULY	0	0	0	.000		JULY	23,419	2,446	2	.008
	AUG.	21,652	2,189	1	.007		AUG.	1,788	96	1	.004
	SEPT.	124	8.2	0	.005		SEPT.	4,560	282	0	.005
	YEAR	93,649	11,710	8	.009		YEAR	353,996	109666	72	.023
1980	CUM.AVG.	172,500	24,670	16	.011	1981	CUM.AVG.	190,600	33,170	22	.013

WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT	WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT
1982	OCT.	98,507	21,646	14	.016	1983	OCT.	0	0	0	.000
	NOV.	18,972	1,818	1	.007		NOV.	0	0	0	.000
	DEC.	7,079	488	0	.005		DEC.	0	0	0	.000
	JAN.	4,596	285	0	.004		JAN.	0	0	0	.000
	FEB.	1,866	101	0	.004		FEB.	0	0	0	.000
	MAR.	6,222	414	0	.005		MAR.	0	0	0	.000
	APR.	1,851	100	0	.004		APR.	0	0	0	.000
	MAY	21,172	2,120	1	.007		MAY	0	0	0	.000
	JUNE	4,858	305	0	.005		JUNE	0	0	0	.000
	JULY	856	44	0	.004		JULY	0	0	0	.000
	AUG.	1	1	0	.130		AUG.	0	0	0	.000
	SEPT.	0	0	0	.000		SEPT.	18,337	1,733	1	.007
	YEAR	165,979	27,323	18	.012		YEAR	18,337	1,733	1	.007
1982	CUM.AVG.	188,400	32,640	22	.013	1983	CUM.AVG.	174,200	30,060	20	.013

TABLE 1.--Monthly, yearly,and cumulative average discharge and sediment loads for station 08194000 Nueces River at Cotulla, Texas, 1972-85--Continued

(ac-ft, acre-feet; % wt, percent weight; cum. avg. cumulative average)

WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT	WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT
1984	OCT.	2,513	140	0	.004	1985	OCT.	71,167	12,912	8	.013
	NOV.	1,721	92	0	.004		NOV.	1,197	63	0	.004
	DEC.	8.2	1.7	0	.016		DEC.	1.9	1.1	0	.043
	JAN.	78	5.9	0	.006		JAN.	46,769	6,760	4	.011
	FEB.	1	1	0	.063		FEB.	5,647	367	0	.005
	MAR.	0	0	0	.000		MAR.	9,898	752	0	.006
	APR.	0	0	0	.000		APR.	5,716	373	0	.005
	MAY	0	0	0	.000		MAY	18,776	1,791	1	.007
	JUNE	0	0	0	.000		JUNE	2,901	165	0	.004
	JULY	0	0	0	.000		JULY	939	49	0	.004
	AUG.	0	0	0	.000		AUG.	0	0	0	.000
	SEPT.	0	0	0	.000		SEPT.	0	0	0	.000
	YEAR	4,321	241	0	.004		YEAR	163,013	23,234	15	.010
1984	CUM.AVG.	161,200	27770	18	.013	1985	CUM.AVG.	161,300	27,440	18	.012

TABLE 2.--Monthly, yearly,and cumulative average discharge and sediment loads for station 08207000 Frio River at Calliham, Texas, 1972-81

(ac-ft, acre-feet; % wt, percent weight; cum. avg., cumulative average)

WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT	WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT
1972	OCT.	116,900	16,080	11	.010	1973	OCT.	2,850	162	0	.004
	NOV.	15,780	1,670	1	.008		NOV.	1,430	28	0	.001
	DEC.	7,360	383	0	.004		DEC.	1,840	53	0	.002
	JAN.	4,870	102	0	.002		JAN.	2,320	66	0	.002
	FEB.	3,610	95	0	.002		FEB.	3,480	229	0	.005
	MAR.	2,270	110	0	.004		MAR.	2,630	133	0	.004
	APR.	1,580	83	0	.004		APR.	8,710	3,140	2	.026
	MAY	20,880	12,870	8	.045		MAY	2,020	145	0	.005
	JUNE	2,590	263	0	.007		JUNE	30,200	19,160	13	.047
	JULY	595	32	0	.004		JULY	107,500	12,980	9	.009
	AUG.	4,180	1,880	1	.033		AUG.	22,700	4,140	3	.013
	SEPT.	24,070	11,720	8	.036		SEPT.	45,560	17,270	11	.028
	YEAR	204,700	45,290	30	.016		YEAR	231,200	57,510	38	.018
1972	CUM.AVG.	204,700	45,290	30	.016	1973	CUM.AVG.	218,000	51,400	34	.017

WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT	WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT
1974	OCT.	88,300	10,160	7	.008	1975	OCT.	8,520	618	0	.005
	NOV.	16,050	1,850	1	.008		NOV.	7,920	613	0	.005
	DEC.	8,570	186	0	.002		DEC.	6,760	189	0	.002
	JAN.	7,510	146	0	.001		JAN.	6,710	360	0	.004
	FEB.	5,400	136	0	.002		FEB.	21,610	3,620	2	.012
	MAR.	14,570	3,050	2	.015		MAR.	5,790	779	1	.010
	APR.	3,480	234	0	.005		APR.	5,910	853	1	.011
	MAY	11,050	3,040	2	.020		MAY	55,560	34,140	22	.045
	JUNE	3,840	341	0	.007		JUNE	22,550	5,800	4	.019
	JULY	862	80	0	.007		JULY	10,160	2,880	2	.021
	AUG.	31,840	17,760	12	.041		AUG.	4,770	358	0	.006
	SEPT.	71,330	45,870	30	.047		SEPT.	9,350	2,270	1	.018
	YEAR	262,800	82,850	54	.023		YEAR	165,600	52,480	34	.023
1974	CUM.AVG.	232,900	61,880	41	.019	1975	CUM.AVG.	216,100	59,530	39	.020

WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT	WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT
1976	OCT.	4,380	240	0	.004	1977	OCT.	40,760	21,160	14	.038
	NOV.	3,970	272	0	.005		NOV.	32,830	4,120	3	.009
	DEC.	3,850	290	0	.006		DEC.	21,990	2,220	1	.007
	JAN.	4,000	340	0	.006		JAN.	17,140	2,040	1	.009
	FEB.	2,290	159	0	.005		FEB.	13,960	1,170	1	.006
	MAR.	2,140	208	0	.007		MAR.	12,010	1,500	1	.009
	APR.	20,620	14,160	9	.050		APR.	112,000	33,420	22	.022
	MAY	60,770	54,100	35	.065		MAY	34,210	8,350	5	.018
	JUNE	6,920	603	0	.006		JUNE	13,000	1,640	1	.009
	JULY	66,380	31,490	21	.035		JULY	6,060	468	0	.006
	AUG.	18,610	2,230	1	.009		AUG.	3,010	203	0	.005
	SEPT.	9,570	1,060	1	.008		SEPT.	3,800	466	0	.009
	YEAR	203,500	105200	69	.038		YEAR	310,800	76,760	50	.018
1976	CUM.AVG.	213,600	68,670	45	.024	1977	CUM.AVG.	229,800	70,020	46	.022

TABLE 2.--Monthly, yearly,and cumulative average discharge and sediment loads for station 08207000 Frio River at Calliham, Texas, 1972-81--Continued

(ac-ft, acre-feet; % wt, percent weight; cum. avg., cumulative average)

WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT	WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT
1978	OCT.	8,868	6,630	4	.055	1979	OCT.	2,070	94	0	.003
	NOV.	9,820	3,270	2	.024		NOV.	2,905	94	0	.002
	DEC.	6,190	437	0	.005		DEC.	2,919	119	0	.003
	JAN.	5,986	280	0	.003		JAN.	5,335	698	0	.010
	FEB.	4,276	176	0	.003		FEB.	3,147	135	0	.003
	MAR.	3,225	157	0	.004		MAR.	11,643	4,450	3	.028
	APR.	2,582	190	0	.005		APR.	32,658	17,330	11	.039
	MAY	2,368	783	1	.024		MAY	11,198	2,450	2	.016
	JUNE	61,454	33,210	22	.040		JUNE	79,470	16,650	11	.015
	JULY	2,112	822	1	.029		JULY	9,679	3,800	2	.029
	AUG.	54,542	19,610	13	.026		AUG.	2,780	92	0	.002
	SEPT.	22,834	11,100	7	.036		SEPT.	1,814	74	0	.003
	YEAR	184,257	76,670	50	.031		YEAR	165,618	45,990	30	.020
1978	CUM.AVG.	223,300	70,970	46	.023	1979	CUM.AVG.	216,100	67,840	44	.023

WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT	WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT
1980	OCT.	1,172	151	0	.009	1981	OCT.	9,610	3,146	2	.024
	NOV.	1,359	182	0	.010		NOV.	1,066	134	0	.009
	DEC.	2,838	496	0	.013		DEC.	1,002	124	0	.009
	JAN.	3,279	610	0	.014		JAN.	1,858	276	0	.011
	FEB.	1,658	237	0	.011		FEB.	986	121	0	.009
	MAR.	812	95	0	.009		MAR.				
	APR.	644	72	0	.008		APR.				
	MAY	97,353	202007	132	.152		MAY				
	JUNE	8,932	2,797	2	.023		JUNE				
	JULY	289	30	0	.008		JULY				
	AUG.	36,584	31,323	21	.063		AUG.				
	SEPT.	17,425	8,448	6	.036		SEPT.				
	YEAR	172,345	246448	162	.105		YEAR	14,522	3,801	3	.019
1980	CUM.AVG.	211,200	87,690	57	.031	1981	CUM.AVG.	203,400	84,210	55	.030

TABLE 3.--Monthly, yearly, and cumulative average discharge and suspended sediment loads for station 08211000 Nueces River near Mathis, Texas, 1972-85

(ac-ft, acre-feet; % wt, percent weight; cum. avg., cumulative average)

WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT	WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT
1972	OCT.	913,000	53,680	35	.004	1973	OCT.	9,890	323	0	.002
	NOV.	80,890	5,480	4	.005		NOV.	8,210	294	0	.003
	DEC.	25,730	1,050	1	.003		DEC.	7,580	131	0	.001
	JAN.	19,660	479	0	.002		JAN.	7,620	243	0	.002
	FEB.	16,940	210	0	.001		FEB.	5,810	105	0	.001
	MAR.	6,370	84	0	.001		MAR.	6,450	160	0	.002
	APR.	8,180	158	0	.001		APR.	6,380	225	0	.003
	MAY	154,900	3,240	2	.002		MAY	8,190	193	0	.002
	JUNE	15,240	256	0	.001		JUNE	250,700	6,690	4	.002
	JULY	7,700	265	0	.003		JULY	103,900	3,540	2	.003
	AUG.	9,200	301	0	.002		AUG.	34,820	789	1	.002
	SEPT.	34,380	2,330	2	.005		SEPT.	67,070	1,340	1	.001
	YEAR	1,292,000	67,530	44	.004		YEAR	516,600	14,030	9	.002
1972	CUM.AVG.	1,292,000	67,530	44	.002	1973	CUM.AVG.	904,300	40,780	26	.003

WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT	WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT
1974	OCT.	465,900	20,480	13	.003	1975	OCT.	9,940	313	0	.002
	NOV.	65,950	1,330	1	.001		NOV.	19,330	566	0	.002
	DEC.	19,830	386	0	.001		DEC.	11,730	310	0	.002
	JAN.	14,710	286	0	.001		JAN.	10,730	793	1	.005
	FEB.	14,830	433	0	.002		FEB.	19,140	352	0	.001
	MAR.	29,340	693	0	.002		MAR.	7,980	254	0	.002
	APR.	13,140	297	0	.002		APR.	5,990	119	0	.001
	MAY	11,930	307	0	.002		MAY	97,470	1,610	1	.001
	JUNE	10,830	295	0	.002		JUNE	119,700	3,810	3	.002
	JULY	9,530	345	0	.003		JULY	67,310	2,480	2	.003
	AUG.	69,930	1,500	1	.002		AUG.	14,820	397	0	.002
	SEPT.	174,600	5,020	3	.002		SEPT.	15,340	441	0	.002
	YEAR	900,500	31,370	21	.003		YEAR	399,500	11,450	8	.002
1974	CUM.AVG.	903,000	37,640	25	.003	1975	CUM.AVG.	777,200	31,100	20	.003

WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT	WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT
1976	OCT.	6,180	116	0	.001	1977	OCT.	158,000	3,330	2	.002
	NOV.	5,140	150	0	.002	1977	NOV.	270,000	10,310	7	.003
	DEC.	3,930	137	0	.003		DEC.	115,000	3,410	2	.002
	JAN.	3,320	90	0	.002		JAN.	49,410	615	0	.001
	FEB.	3,300	81	0	.002		FEB.	28,870	637	0	.002
	MAR.	3,980	103	0	.002		MAR.	16,040	385	0	.002
	APR.	3,300	101	0	.002		APR.	276,100	12,800	8	.003
	MAY	70,390	3,470	2	.003		MAY	87,910	2,330	2	.002
	JUNE	8,160	1,910	1	.017		JUNE	32,310	560	0	.001
	JULY	136,200	3,470	2	.002		JULY	8,510	198	0	.002
	AUG.	57,040	1,360	1	.002		AUG.	5,640	111	0	.001
	SEPT.	98,620	1,700	1	.001		SEPT.	4,660	143	0	.002
	YEAR	399,600	12,460	8	.002		YEAR	1,053,000	34,830	23	.002
1976	CUM.AVG.	701,600	27,368	18	.003	1977	CUM.AVG.	760,200	28,610	19	.003

Table 3.--Monthly, yearly, and cumulative average discharge and suspended sediment loads for station 08211000 Nueces River near Mathis, Texas, 1972-85--Continued

(ac-ft, acre-feet; % wt, percent weight; cum. avg., cumulative average)

WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT	WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT
1978	OCT.	6,966	194	0	.002	1979	OCT.	7,257	159	0	.002
	NOV.	6,180	168	0	.002		NOV.	6,577	184	0	.002
	DEC.	6,202	155	0	.002		DEC.	6,053	142	0	.002
	JAN.	5,889	154	0	.002		JAN.	8,090	475	0	.004
	FEB.	5,091	103	0	.001		FEB.	5,438	133	0	.002
	MAR.	7,196	220	0	.002		MAR.	6,497	87	0	.001
	APR.	6,970	255	0	.003		APR.	47,332	1,300	1	.002
	MAY	8,410	228	0	.002		MAY	35,443	1,310	1	.003
	JUNE	46,112	511	0	.001		JUNE	205,938	3,460	2	.001
	JULY	9,427	280	0	.002		JULY	17,811	413	0	.002
	AUG.	54,111	1,000	1	.001		AUG.	8,727	365	0	.003
	SEPT.	59,576	1,010	1	.001		SEPT.	6,333	181	0	.002
	YEAR	222,130	4,280	3	.001		YEAR	361,496	8,210	5	.002
1978	CUM.AVG.	683,300	25,140	17	.003	1979	CUM.AVG.	643,100	23,020	15	.003

WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT	WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT
1980	OCT.	7,646	208	0	.002	1981	OCT.	11,849	399	0	.002
	NOV.	7,204	234	0	.002		NOV.	6,952	167	0	.002
	DEC.	7,033	202	0	.002		DEC.	6,053	158	0	.002
	JAN.	8,654	264	0	.002		JAN.	6,216	172	0	.002
	FEB.	6,337	160	0	.002		FEB.	5,797	165	0	.002
	MAR.	7,574	150	0	.001		MAR.	6,745	152	0	.002
	APR.	8,622	237	0	.002		APR.	7,475	192	0	.002
	MAY	124,551	3,340	2	.002		MAY	176,690	3,640	2	.002
	JUNE	36,637	1,870	1	.004		JUNE	446,168	19,620	13	.003
	JULY	11,190	775	1	.005		JULY	161,748	8,840	6	.004
	AUG.	304,792	17,430	11	.004		AUG.	13,949	365	0	.002
	SEPT.	29,137	1,690	1	.004		SEPT.	68,416	1,320	1	.001
	YEAR	559,377	26,560	17	.003		YEAR	918,058	35,190	23	.003
1980	CUM.AVG.	633,800	23,410	15	.003	1981	CUM.AVG.	662,200	24,590	16	.003

WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT	WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT
1982	OCT.	104,447	3,420	2	.002	1983	OCT.	8,854	174	0	.001
	NOV.	45,088	1,260	1	.002		NOV.	7,582	208	0	.002
	DEC.	13,085	363	0	.002		DEC.	8,455	208	0	.002
	JAN.	10,972	330	0	.002		JAN.	8,078	162	0	.001
	FEB.	9,245	288	0	.002		FEB.	5,992	122	0	.001
	MAR.	8,949	231	0	.002		MAR.	7,285	98	0	.001
	APR.	7,937	198	0	.002		APR.	8,767	328	0	.003
	MAY	100,208	2,310	2	.002		MAY	10,554	347	0	.002
	JUNE	14,366	338	0	.002		JUNE	10,716	657	0	.005
	JULY	11,758	469	0	.003		JULY	10,010	282	0	.002
	AUG.	11,012	344	0	.002		AUG.	10,645	351	0	.002
	SEPT.	9,802	238	0	.002		SEPT.	8,985	360	0	.003
	YEAR	346,869	9,790	6	.002		YEAR	105,923	3,300	2	.002
1982	CUM.AVG.	633,600	23,250	15	.003	1983	CUM.AVG.	589,600	21,580	14	.003

TABLE 3.--Monthly, yearly, and cumulative average discharge and suspended sediment loads for station 08211000 Nueces River near Mathis, Texas, 1972-85--Continued

(ac-ft, acre-feet; % wt, percent weight, cum. avg, cumulative average)

WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT	WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT
1984	OCT.	8,364	255	0	.002	1985	OCT.	4,534	133	0	.002
	NOV.	8,425	244	0	.002		NOV.	4,501	132	0	.002
	DEC.	9,804	611	0	.005		DEC.	5,917	168	0	.002
	JAN.	8,449	215	0	.002		JAN.	6,212	176	0	.002
	FEB.	7,852	253	0	.002		FEB.	5,831	166	0	.002
	MAR.	8,953	477	0	.004		MAR.	6,238	176	0	.002
	APR.	10,756	540	0	.004		APR.	20,244	533	0	.002
	MAY	10,792	458	0	.003		MAY	99,982	2,798	2	.002
	JUNE	10,625	529	0	.004		JUNE	51,141	1,366	1	.002
	JULY	8,540	269	0	.002		JULY	48,407	1,289	1	.002
	AUG.	7,055	150	0	.002		AUG.	11,173	301	0	.002
	SEPT.	5,738	139	0	.002		SEPT.	7,936	219	0	.002
	YEAR	105,353	4,140	3	.003		YEAR	272,116	7,459	5	.002
1984	CUM.AVG.	552,300	20,240	13	.003	1985	CUM.AVG.	532,300	19,330	13	.003

TABLE 4.--Monthly, yearly, and cumulative average discharge and suspended sediment loads for station 08208000 Atacosa River at Whitsett, Texas, 1972-85

(ac-ft., acre-feet; % wt, percent weight; cum. avg. cumulative average)

WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT	WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT
1972	OCT.	20,353	5,646	4	.020	1973	OCT.	552	117	0	.016
	NOV.	1,071	197	0	.014		NOV.	356	85	0	.018
	DEC.	1,224	222	0	.013		DEC.	346	85	0	.018
	JAN.	813	159	0	.014		JAN.	554	118	0	.016
	FEB.	702	139	0	.015		FEB.	2,897	528	0	.013
	MAR.	569	121	0	.016		MAR.	755	150	0	.015
	APR.	316	79	0	.018		APR.	10,217	2,550	2	.018
	MAY	54,138	18,884	12	.026		MAY	1,212	220	0	.013
	JUNE	4,066	737	0	.013		JUNE	171,534	111034	73	.048
	JULY	475	106	0	.016		JULY	4,042	666	0	.012
	AUG.	2,522	487	0	.014		AUG.	1,640	289	0	.013
	SEPT.	6,100	1,256	1	.015		SEPT.	26,010	8,944	6	.025
	YEAR	92,350	28,030	18	.022		YEAR	220,100	124800	82	.042
1972	CUM.AVG.	92,350	28,030	18	.022	1973	CUM.AVG.	156,200	76,420	50	.036

WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT	WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT
1974	OCT.	34,870	8,903	6	.019	1975	OCT.	826	161	0	.014
	NOV.	2,886	485	0	.012		NOV.	1,622	286	0	.013
	DEC.	1,386	246	0	.013		DEC.	675	138	0	.015
	JAN.	1,281	230	0	.013		JAN.	582	123	0	.016
	FEB.	982	181	0	.014		FEB.	587	120	0	.015
	MAR.	883	170	0	.014		MAR.	543	117	0	.016
	APR.	746	148	0	.015		APR.	1,488	274	0	.014
	MAY	2,755	477	0	.013		MAY	40,402	18,757	12	.034
	JUNE	1,211	220	0	.013		JUNE	13,976	3,912	3	.021
	JULY	156	51	0	.024		JULY	3,368	583	0	.013
	AUG.	8,598	1,745	1	.015		AUG.	802	157	0	.014
	SEPT.	11,064	2,524	2	.017		SEPT.	904	171	0	.014
	YEAR	66,820	15,380	10	.017		YEAR	65,770	24,800	16	.028
1974	CUM.AVG.	126,400	56,070	37	.033	1975	CUM.AVG.	111,300	48,250	32	.032

WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT	WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT
1976	OCT.	689	136	0	.015	1977	OCT.	45,676	14,362	9	.023
	NOV.	434	98	0	.017		NOV.	16,181	3,710	2	.017
	DEC.	400	94	0	.017		DEC.	8,946	1,658	1	.014
	JAN.	474	106	0	.016		JAN.	6,548	1,163	1	.013
	FEB.	393	91	0	.017		FEB.	2,124	356	0	.012
	MAR.	413	95	0	.017		MAR.	1,204	218	0	.013
	APR.	7,243	1,394	1	.014		APR.	136,756	83,381	55	.045
	MAY	19,611	4,297	3	.016		MAY	15,848	3,612	2	.017
	JUNE	793	154	0	.014		JUNE	2,430	412	0	.012
	JULY	5,286	950	1	.013		JULY	659	134	0	.015
	AUG.	161	51	0	.023		AUG.	229	64	0	.021
	SEPT.	5,058	977	1	.014		SEPT.	1,690	309	0	.013
	YEAR	41,000	8,442	6	.015		YEAR	238,300	109400	72	.034
1976	CUM.AVG.	97,210	40,290	26	.030	1977	CUM.AVG.	120,700	51,810	34	.032

TABLE 4.--Monthly, yearly, and cumulative average discharge and suspended sediment loads for station 08208000 Atascosa River at Whitsett, Texas, 1972-85--Continued

(ac-ft; acre-feet; % wt, percent weight; cum. avg., cumulative average)

WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT	WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT
1978	OCT.	581	121	0	.015	1979	OCT.	1,010	189	0	.014
	NOV.	1,706	310	0	.013		NOV.	3,092	564	0	.013
	DEC.	410	95	0	.017		DEC.	1,032	196	0	.014
	JAN.	456	103	0	.017		JAN.	7,250	1,469	1	.015
	FEB.	511	109	0	.016		FEB.	1,507	263	0	.013
	MAR.	419	97	0	.017		MAR.	869	168	0	.014
	APR.	374	87	0	.017		APR.	14,670	3,729	2	.019
	MAY	669	134	0	.015		MAY	3,979	696	0	.013
	JUNE	7,273	1,561	1	.016		JUNE	20,890	5,983	4	.021
	JULY	4,155	942	1	.017		JULY	1,460	258	0	.013
	AUG.	28,605	12,086	8	.031		AUG.	602	125	0	.015
	SEPT.	23,802	6,372	4	.020		SEPT.	715	141	0	.014
	YEAR	68,960	22,020	14	.023		YEAR	57,080	13,780	9	.018
1978	CUM.AVG.	113,300	47,550	31	.031	1979	CUM.AVG.	106,300	43,330	28	.030

WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT	WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT
1980	OCT.	111	42	0	.028	1981	OCT.	942	178	0	.014
	NOV.	196	57	0	.021		NOV.	2,664	478	0	.013
	DEC.	1,355	257	0	.014		DEC.	1,122	206	0	.013
	JAN.	500	109	0	.016		JAN.	1,429	255	0	.013
	FEB.	417	95	0	.017		FEB.	899	169	0	.014
	MAR.	381	90	0	.017		MAR.	1,954	350	0	.013
	APR.	205	59	0	.021		APR.	2,576	480	0	.014
	MAY	78,848	50,508	33	.047		MAY	2,652	468	0	.013
	JUNE	865	165	0	.014		JUNE	5,840	1,017	1	.013
	JULY	305	74	0	.018		JULY	1,746	303	0	.013
	AUG.	55,064	31,780	21	.042		AUG.	1,275	265	0	.015
	SEPT.	3,981	730	0	.013		SEPT.	13,579	3,620	2	.020
	YEAR	142,200	83,960	55	.043		YEAR	36,680	7,789	5	.016
1980	CUM.AVG.	110,300	47,840	31	.032	1981	CUM.AVG.	103,000	43,840	29	.031

WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT	WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT
1982	OCT.	2,819	496	0	.013	1983	OCT.	4,562	978	1	.016
	NOV.	1,303	232	0	.013		NOV.	571	118	0	.015
	DEC.	843	164	0	.014		DEC.	424	97	0	.017
	JAN.	702	142	0	.015		JAN.	449	101	0	.017
	FEB.	7,078	1,645	1	.017		FEB.	1,250	227	0	.013
	MAR.	1,428	253	0	.013		MAR.	3,411	651	0	.014
	APR.	806	157	0	.014		APR.	412	94	0	.017
	MAY	7,948	1,926	1	.018		MAY	1,097	201	0	.013
	JUNE	3,297	670	0	.015		JUNE	2,440	435	0	.013
	JULY	132	43	0	.024		JULY	1,559	274	0	.013
	AUG.	26	12	0	.034		AUG.	2,536	493	0	.014
	SEPT.	1,134	210	0	.014		SEPT.	45,599	26,967	18	.043
	YEAR	27,520	5,950	4	.016		YEAR	64,310	30,640	20	.035
1982	CUM.AVG.	96,070	40,400	26	.031	1983	CUM.AVG.	93,420	39,600	26	.031

TABLE 4.--Monthly, yearly, and cumulative average discharge and suspended sediment loads for station 08208000 Atascosa River at Whitsett, Texas, 1972-85--Continued

(ac-ft, acre-feet; % wt, percent weight; cum. avg., cumulative average)

WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT	WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT
1984	OCT.	4,443	786	1	.013	1985	OCT.	12,916	2,819	2	.016
	NOV.	499	109	0	.016		NOV.	2,122	369	0	.013
	DEC.	489	108	0	.016		DEC.	1,426	252	0	.013
	JAN.	2,375	439	0	.014		JAN.	2,376	400	0	.012
	FEB.	450	100	0	.016		FEB.	728	143	0	.014
	MAR.	413	96	0	.017		MAR.	2,915	529	0	.013
	APR.	283	72	0	.019		APR.	14,626	4,160	3	.021
	MAY	367	83	0	.017		MAY	2,332	401	0	.013
	JUNE	303	75	0	.018		JUNE	2,490	422	0	.012
	JULY	109	39	0	.026		JULY	5,932	1,297	1	.016
	AUG.	5	11	0	.163		AUG.	29	21	0	.054
	SEPT.	228	64	0	.020		SEPT.	4,084	930	1	.017
	YEAR	9,960	1,980	1	.015		YEAR	51,980	11,740	8	.017
1984	CUM.AVG.	87,000	36,690	24	.031	1985	CUM.AVG.	84,500	34,900	23	.030

TABLE 5.--Monthly, yearly,and cumulative average discharge and suspended sediment loads for station 08210000 Nueces River near Three Rivers, Texas, 1972-85

(ac-ft, acre-feet; % wt, percent weight; cum. avg., cumulative average)

WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT	WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT
1972	OCT.	849,238	2080245	1,364	.180	1973	OCT.	10,300	2,426	2	.017
	NOV.	71,825	33,006	22	.034		NOV.	2,287	382	0	.012
	DEC.	24,657	5,584	4	.017		DEC.	2,612	434	0	.012
	JAN.	16,901	3,560	2	.015		JAN.	3,336	553	0	.012
	FEB.	11,165	2,119	1	.014		FEB.	8,959	1,966	1	.016
	MAR.	8,412	1,565	1	.014		MAR.	6,081	1,088	0	.013
	APR.	2,953	493	0	.012		APR.	25,307	10,645	7	.031
	MAY	146,854	91,712	60	.046		MAY	3,227	538	0	.012
	JUNE	15,453	3,484	2	.017		JUNE	216,193	225562	148	.077
	JULY	2,059	348	0	.012		JULY	113,462	77,570	51	.050
	AUG.	24,780	6,945	5	.021		AUG.	30,970	8,345	5	.020
	SEPT.	45,531	22,135	15	.036		SEPT.	75,760	48,141	32	.047
	YEAR	1,219,800	2251200	1,477	.136		YEAR	498,600	377600	248	.056
1972	CUM.AVG.	1,219,800	2251200	1,477	.136	1973	CUM.AVG.	859,200	1314400	862	.112

WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT	WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT
1974	OCT.	456,225	504676	331	.081	1975	OCT.	11,213	2,103	1	.014
	NOV.	66,939	27,110	18	.030		NOV.	24,139	5,566	4	.017
	DEC.	23,649	5,254	3	.016		DEC.	12,391	2,354	2	.014
	JAN.	16,027	3,206	2	.015		JAN.	11,562	2,162	1	.014
	FEB.	11,129	2,123	1	.014		FEB.	25,202	6,987	5	.020
	MAR.	39,876	14,732	10	.027		MAR.	9,672	1,758	1	.013
	APR.	7,032	1,246	1	.013		APR.	11,413	2,263	1	.015
	MAY	25,006	6,510	4	.019		MAY	127,948	157944	104	.091
	JUNE	6,377	1,201	1	.014		JUNE	128,489	62,124	41	.036
	JULY	951	175	0	.014		JULY	80,233	35,274	23	.032
	AUG.	96,728	56,223	37	.043		AUG.	20,176	4,649	3	.017
	SEPT.	128,031	77,978	51	.045		SEPT.	21,402	5,611	4	.019
	YEAR	878,000	700400	459	.059		YEAR	483,800	288800	189	.044
1974	CUM.AVG.	865,500	1109700	728	.094	1975	CUM.AVG.	770,000	904500	593	.086

WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT	WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT
1976	OCT.	8,952	1,932	1	.016	1977	OCT.	168,685	122112	80	.053
	NOV.	14,722	3,687	2	.018		NOV.	294,220	363798	239	.091
	DEC.	5,163	870	1	.012		DEC.	110,731	52,544	34	.035
	JAN.	4,368	729	0	.012		JAN.	53,029	16,351	11	.023
	FEB.	2,910	482	0	.012		FEB.	32,309	8,176	5	.019
	MAR.	2,654	441	0	.012		MAR.	25,022	5,635	4	.017
	APR.	30,038	9,092	6	.022		APR.	302,377	424130	278	.103
	MAY	89,059	41,311	27	.034		MAY	100,187	39,947	26	.029
	JUNE	11,100	2,260	1	.015		JUNE	41,011	12,105	8	.022
	JULY	149,469	80,167	53	.039		JULY	11,389	2,191	1	.014
	AUG.	75,117	33,060	22	.032		AUG.	3,989	666	0	.012
	SEPT.	100,895	63,854	42	.046		SEPT.	5,484	1,048	1	.014
	YEAR	494,400	237900	156	.035		YEAR	1,148,400	1048700	688	.067
1976	CUM.AVG.	714,900	771200	506	.079	1977	CUM.AVG.	787,200	817400	536	.076

TABLE 5.--Monthly, yearly, and cumulative average discharge and suspended sediment loads for station 08210000 Nueces River near Three Rivers, Texas, 1972-85--Continued

(ac-ft, acre-feet; % wt, percent weight; cum. avg., cumulative average)

WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT	WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT
1978	OCT.	10,407	2,680	2	.019	1979	OCT.	4,792	817	1	.013
	NOV.	12,155	2,621	2	.016		NOV.	6,183	1,172	1	.014
	DEC.	7,674	1,345	1	.013		DEC.	3,874	645	0	.012
	JAN.	6,734	1,161	1	.013		JAN.	13,631	3,123	2	.017
	FEB.	4,873	824	1	.012		FEB.	4,955	854	1	.013
	MAR.	3,862	642	0	.012		MAR.	9,273	2,141	1	.017
	APR.	3,636	615	0	.012		APR.	63,926	31,466	21	.036
	MAY	10,037	2,308	2	.017		MAY	27,011	6,845	4	.019
	JUNE	101,994	70,260	46	.051		JUNE	215,140	162829	107	.056
	JULY	5,939	1,751	1	.022		JULY	14,432	3,048	2	.016
	AUG.	84,618	69,082	45	.060		AUG.	3,552	595	0	.012
	SEPT.	67,132	31,050	20	.034		SEPT.	2,932	492	0	.012
	YEAR	319,100	184300	121	.042		YEAR	369,700	214000	140	.043
1978	CUM.AVG.	720,300	727000	477	.074	1979	CUM.AVG.	676,500	662900	435	.072

WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT	WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT
1980	OCT.	1,043	189	0	.013	1981	OCT.	9,953	2,403	2	.018
	NOV.	1,457	252	0	.013		NOV.	4,221	817	1	.014
	DEC.	3,991	699	0	.013		DEC.	2,737	456	0	.012
	JAN.	5,086	978	1	.014		JAN.	3,265	558	0	.013
	FEB.	2,136	357	0	.012		FEB.	2,047	342	0	.012
	MAR.	1,073	193	0	.013		MAR.	4,175	794	1	.014
	APR.	778	146	0	.014		APR.	17,802	5,934	4	.024
	MAY	234,547	338715	222	.106		MAY	190,351	138797	91	.054
	JUNE	36,649	13,401	9	.027		JUNE	442,320	541309	355	.090
	JULY	556	114	0	.015		JULY	135,455	103303	68	.056
	AUG.	317,623	554026	363	.128		AUG.	14,626	3,505	2	.018
	SEPT.	31,417	10,595	7	.025		SEPT.	68,758	34,344	23	.037
	YEAR	636,400	919700	603	.106		YEAR	895,700	832600	546	.068
1980	CUM.AVG.	672,000	691400	453	.076	1981	CUM.AVG.	694,400	705500	463	.075

WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT	WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT
1982	OCT.	116,118	61,480	40	.039	1983	OCT.	19,958	6,188	4	.023
	NOV.	43,716	15,355	10	.026		NOV.	1,293	231	0	.013
	DEC.	15,156	3,007	2	.015		DEC.	748	144	0	.014
	JAN.	12,131	2,289	2	.014		JAN.	667	131	0	.014
	FEB.	15,075	3,931	3	.010		FEB.	1,748	316	0	.013
	MAR.	13,274	2,588	2	.014		MAR.	7,573	2,303	2	.022
	APR.	7,196	1,262	1	.013		APR.	506	105	0	.015
	MAY	104,120	78,069	51	.055		MAY	1,221	229	0	.014
	JUNE	19,865	5,230	3	.019		JUNE	5,591	1,120	1	.015
	JULY	2,029	344	0	.012		JULY	2,102	399	0	.014
	AUG.	518	107	0	.015		AUG.	3,524	868	1	.018
	SEPT.	3,506	861	1	.018		SEPT.	101,078	146237	96	.106
	YEAR	352,700	174500	114	.036		YEAR	146,000	158300	104	.080
1982	CUM.AVG.	663,300	657200	431	.073	1983	CUM.AVG.	620,200	615700	404	.073

TABLE 5.--Monthly, yearly,and cumulative average discharge and suspended sediment loads for station 08210000 Nueces River near Three Rivers, Texas, 1972-85--Continued

(ac-ft, acre-feet; % wt, percent weight; cum. avg., cumulative average)

WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT	WATER YEAR	MONTH	DISCHARGE ACRE-FEET	SUSPENDED SEDIMENT TONS	AC-FT	% WT
1984	OCT.	20,964	5,646	4	.020	1985	OCT.	89,705	43,764	29	.036
	NOV.	6,873	1,451	1	.016		NOV.	13,427	3,910	3	.021
	DEC.	664	131	0	.014		DEC.	674	132	0	.014
	JAN.	4,807	1,071	1	.016		JAN.	40,797	14,760	10	.027
	FEB.	625	123	0	.014		FEB.	4,810	828	1	.013
	MAR.	636	126	0	.015		MAR.	23,155	6,031	4	.019
	APR.	256	65	0	.019		APR.	42,074	15,918	10	.028
	MAY	629	127	0	.015		MAY	97,231	48,249	32	.036
	JUNE	13,034	3,153	2	.018		JUNE	44,557	15,613	10	.026
	JULY	11,116	2,790	2	.018		JULY	48,565	19,630	13	.030
	AUG.	90	35	0	.029		AUG.	304	74	0	.018
	SEPT.	76	32	0	.031		SEPT.	4,618	1,106	1	.018
	YEAR	59,770	14,800	10	.018		YEAR	410,000	170000	112	.030
1984	CUM.AVG.	577,100	569400	373	.072	1985	CUM.AVG.	565,200	540900	355	.070

ANALYSIS OF SUSPENDED-SEDIMENT RECORDS

The quantity of sediment is arrived at by making a calculation based on dry material weighing 70 lb/ft^3 (McCaughan and Etheridge Consulting Engineers (1973) reported that the U.S. Soil Conservation Service determined that the weight of the settled sediment in Lake Corpus Christi was nearly 35 lb/ft^3, in-place, or about one-half of the dry weight). Therefore, to arrive at the in-place volume of sediment in the lake bottom, the volumes shown in the suspended-sediment data should be doubled (tables 1-5).

To make a comparison of the sediment records with the McCaughan and Etheridge Consulting Engineers' (1973) study in Lake Corpus Christi, the records for the Three Rivers and Mathis stations were used. The data for these two stations were collected during October 1972 to September 1985 (14 years).

During this 14-year period, the records at the Three Rivers station show a total flow of 7,912,400 acre-ft, a cumulative average of 565,200 acre-ft, and a total sediment load of 4,970 acre-ft (dry). McCaughan and Etheridge Consulting Engineers (1973) calculated the net drainage area above Mathis to be 16,625 mi^2 (the 31-mi^2 lake surface was not included in the net drainage area); the drainage area above Three Rivers is 15,600 mi^2. Thus, they increased the sediment load at the Three Rivers station in proportion to the drainage basins to compute the total sediment load entering Lake Corpus Christi. Accordingly, the 14-year record being analyzed was increased by the factor of 1.07, resulting in a total estimated sediment input into the lake of 5,320 acre-ft (dry).

During the same 14-year period, from October 1972 to September 1985, the total sediment load leaving the lake and passing the Mathis station (sediment output) was estimated to be 177 acre-ft (dry). This indicates that approximately

5,140 acre-ft (dry) of sediment remained in Lake Corpus Christi during the period of record. To convert this volume (dry) to the conditions on the lake bottom (wet) the volume was doubled, indicating a total wet volume of 10,300 acre-ft or a cumulative average of approximately 736 acre-ft.

The review of State of Texas sediment records (1942-48) by McCaughan and Etheridge Consulting Engineers (1973) indicated that there was a total sediment input into Lake Corpus Christi of 2,990 acre-ft (dry), a total sediment output of 1,070 acre-ft (dry), and approximately 1,920 acre-ft (dry) of sediment remaining in Lake Corpus Christi. After volume adjustments, a total wet volume of 3,840 acre-ft remained in the lake, which represents an annual average of 640 acre-ft. When the 1972 bottom profile study by McCaughan and Etheridge Consulting Engineers (1973) was compared to the March 1948 lake conditions, a total loss of 20,406 acre-ft (wet) was indicated, which represents an annual loss of 832 acre-ft (wet) for the 24.5-year period of record.

A report by the U.S. Soil Conservation Service (Brown and others, 1948), based on changes of bottom contours during 1942-48, showed a total reduction of lake bottom of 4,414 acre-ft or an annual average of 736 acre-ft. The three studies are summarized in table 6.

The estimated volumes of sediment remaining in Lake Corpus Christi are remarkably in agreement, especially the average annual sediment loads reported by the USGS/WRD and Soil Convervation Service. The greatest anomaly in the data occurs between total output loads determined by the USGS/WRD and McCaughan and Etheridge Consulting Engineers (1973), which were 177 acre-ft and 1,070 acre-ft, respectively. The former represents a 14-year record and the latter a 6-year record. Yet the data indicate that 893 acre-ft more sediment flowed out of Lake Corpus Christi during the 1942-48 study than during the 1972-85 study.

Table 6.--Summary of sedimentation studies of Lake Corpus Christi

Method used to determine sedimentation rate	Study period	Total sediment deposition (wet) (acre-feet)	Average annual sediment deposition (wet) (acre-feet)	Total sediment input (dry) (acre-feet)	Average annual sediment input (dry) (acre-feet)	Total sediment output (dry) (acre-feet)	Average annual sediment output (dry) (acre-feet)
			U.S. Geological Survey (WRD)				
Sediment records	1972-85	10,300	736	5,320	380	177	13
			U.S. Soil Conservation Service (1948)				
Bottom profiles	1942-48	4,414	736	--	--	--	--
			McCaughan and Etheridge Consulting Engineers (1973)				
Sediment records	1942-48	3,840	640	2,990	498	1,070	178
Bottom profiles	1948-72	20,406	832	--	--	--	--

The USGS/WRD estimated the total sediment output on 13 years of data furnished by the TWDB and 1 year of data (1985 water year) based on regression analysis of the 13 years of record. A possible explanation for this difference may be explained by the history of Lake Corpus Christi. The old Mathis Dam was completed, and storage began on July 24, 1934. By March 1948, much of the storage capacity had been decreased because of sedimentation. Later the Wesley E. Seale Dam was completed and deliberate impoundment began April 26, 1958, submerging the old Mathis Dam. The alteration in Lake Corpus Christi, caused by the construction of the new dam, might account for the smaller sedimentation rate during the 1972-85 study.

FUTURE SEDIMENTATION

The survey in October 1972 showed that Lake Corpus Christi had a total lake volume of 272,352 acre-ft (McCaughan and Etheridge Consulting Engineers, 1973). Using the 14-year total sediment load input of 10,300 acre-ft (wet) arrived at earlier in this report, the total lake volume was reduced to 262,052 acre-ft during 1972-85. Future sediment deposition in Lake Corpus Christi will be influenced by the Choke Canyon Reservoir, which will trap and reduce the sediment inflow from the lower Frio River basin to Lake Corpus Christi. However, if the estimated total cumulative average sediment load of 736 acre-ft (wet) per year were to remain constant over the next 14 years, Lake Corpus Christi will have lost another 10,300 acre-ft (wet) of volume by 1999.

SUMMARY

Published and unpublished sediment data were researched to update sediment tables for the 1972 to 1985 water years. When data were not available, regression analysis was used to fill in the missing data. Simulated sediment loads were always checked for validity. The tables were prepared by tabulating

monthly discharge data and sediment loads. Yearly totals and cumulative averages were computed and entered into the tables. Then all the values and computations in the tables were checked.

It was estimated that 10,300 acre-ft (wet) of sediment had entered Lake Corpus Christi during the 14-year period of record and averaged 736 acre-ft (wet) per year. An earlier study by the Soil Conservation Service, based on changes of bottom contours during 1942-48, indicated that 736 acre-ft per year of suspended sediment had entered Lake Corpus Christi during that 6-year period.

The greatest anomaly found in the comparison of the results of different investigations was between the study by the USGS/WRD and the study by McCaughan and Etheridge Consulting Engineers. A total sediment output of 177 acre-ft (dry) was estimated by the USGS/WRD and 1,070 acre-ft (dry) by McCaughan and Etheridge Consulting Engineers using State of Texas sediment records (1942-48). One possible explanation for this anomaly is that the storage capacity of Lake Corpus Christi was greatly expanded in 1958 when a new dam was completed just downstream from the old dam.

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Sample	depth(m)	%S_{tot}	%S_{SO4}	%S_{AV}	%S_{PY}	%S_{ORG}	%C_{CO3}	%C_{ORG}	%Fe
CW-16	843	.03					2.9	19	
CW-15	862	.40	<.01	<.01	.38	.02	4.3	1.1	3.6
CW-14	871	.12					6.9	4.8	
CW-13	880	4.0	<.01	.01	3.3	.12	6.0	5.8	3.4
CW-12	898	.04					7.5	1.3	
CW-11	908	.04	<.01	<.01	.03	.02	3.8	1.7	1.7
CW-10	917	1.0	<.01	<.01	.84	.01	4.2	.49	3.1
CW-9	926	.13					1.3	.46	
CW-8	935	.52	<.01	<.01	.46	.02	1.2	.44	3.3
CW-7	953	.06					2.6	.88	
CW-6	971	1.5	<.01	<.01	1.3	.01	3.6	.35	2.9
CW-5a	981	.47					1.9	.52	
CW-5	990	.37	.07	<.01	.16	.02	2.1	.60	2.2
CW-4	1008	.11					2.1	.26	
CW-3	1026	.80	.02	<.01	.59	.08	6.1	6.2	.90
CW-2	1035	.04					2.5	.26	
CW-1	1043	.86	<.01	<.01	.78	.05	7.2	4.0	2.6